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Marine Isopod Crustaceans of Seto Inland Sea deposited at Toyama Science Museum, 3. Suborder Cymothoida, Limnoriidea and Sphaeromatidea ※

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富山市科学博物館所蔵の瀬戸内海産等脚目甲殻類 Ⅲ ウオノエ亜目、キクイムシ亜目、コツブムシ亜目

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富山市科学博物館(旧称、富山市科学文化センター)に所蔵されている瀬戸内海産等脚目甲殻類標本について前報でウミナナフシ類 (Nunomura, 1993)、ヘラムシ (Nunomura, 1997) について報告したが、本報ではウオノエ亜目7種（ウミクワガタ科3種、スナホリムシ科2種、ウオノエ科2種)、キクイムシ亜目1種、コツブムシ亜目13種の計21種を確認した。そのうち、ウミクワガタ科の1種と、キクイムシ科の1種は新種であることが判明し、それぞれ、*Elaphognathia strombosa*（和名：サキボソシカツノウミクワガタ：新称)、*Limnoria nagatai*（和名：ナガタキクイムシ：新称）として記載した。両種のホロタイプは富山市科学博物館に保管される。前者は同属の他種と頭部前縁にへこみのないことや大顎の基部が太く、先端部が細くなる特異な形態を示す。また、後者は*Limnoria saseboensis* Menzies, 1957に似るが、腹尾節や尾肢が短く、腹尾節背面に多くの剛毛を持つことなどにより区別される。

なお、本シリーズ第2報以後14年余が経過し、等脚目内の分類体系も大きく変更されたので、新しい体系に準拠して報告した。

Key words : Isopoda, Taxonomy, Gnathiidae, Limonoriidae, new species
キーワード：等脚目甲殻類、分類学、ウミクワガタ科、キクイムシ科、新種

Succeeding to the previous papers (Nunomura, 1993, 1997), this paper intended to represent 21 species belonging to the suborders Cymothoida, Limnoriidea and Sphaeromatidea. They include two new species, *Elaphognathia strombosa* and *Limnoria nagatai*. Size of specimens is indicated by the body length (BL) measured from the midpoint of the anterior margin of the head to the midpoint of the posterior margin of the pleotelson.

Holotypes of both species will be deposited at Toyama Science Museum.

＊Contributions from Toyama Science Museum, No. 425

Order Isopoda

Suborder Cymothoida

Family Gnathiidae

***Elaphognathia strombosa* n.sp.**

(Japanese name: Sakiboso-sikatsuno-umikuwagata, new)

(Fig.1)

Material examined : 1♂(holotype 3.1 mm in body length), *Eisenia bicyclis*-bed, Ohba, Misaki-cho, Ehime Pref. Aug. 5, 1976, coll. Kizo Nagata. Holotype will be deposited at Toyama Science Museum, (TOYA Cr-23339).

Description : Body (Fig.1A) 3.6 times as long as wide. Cephalosome rectangular and relatively short, 0.75 times

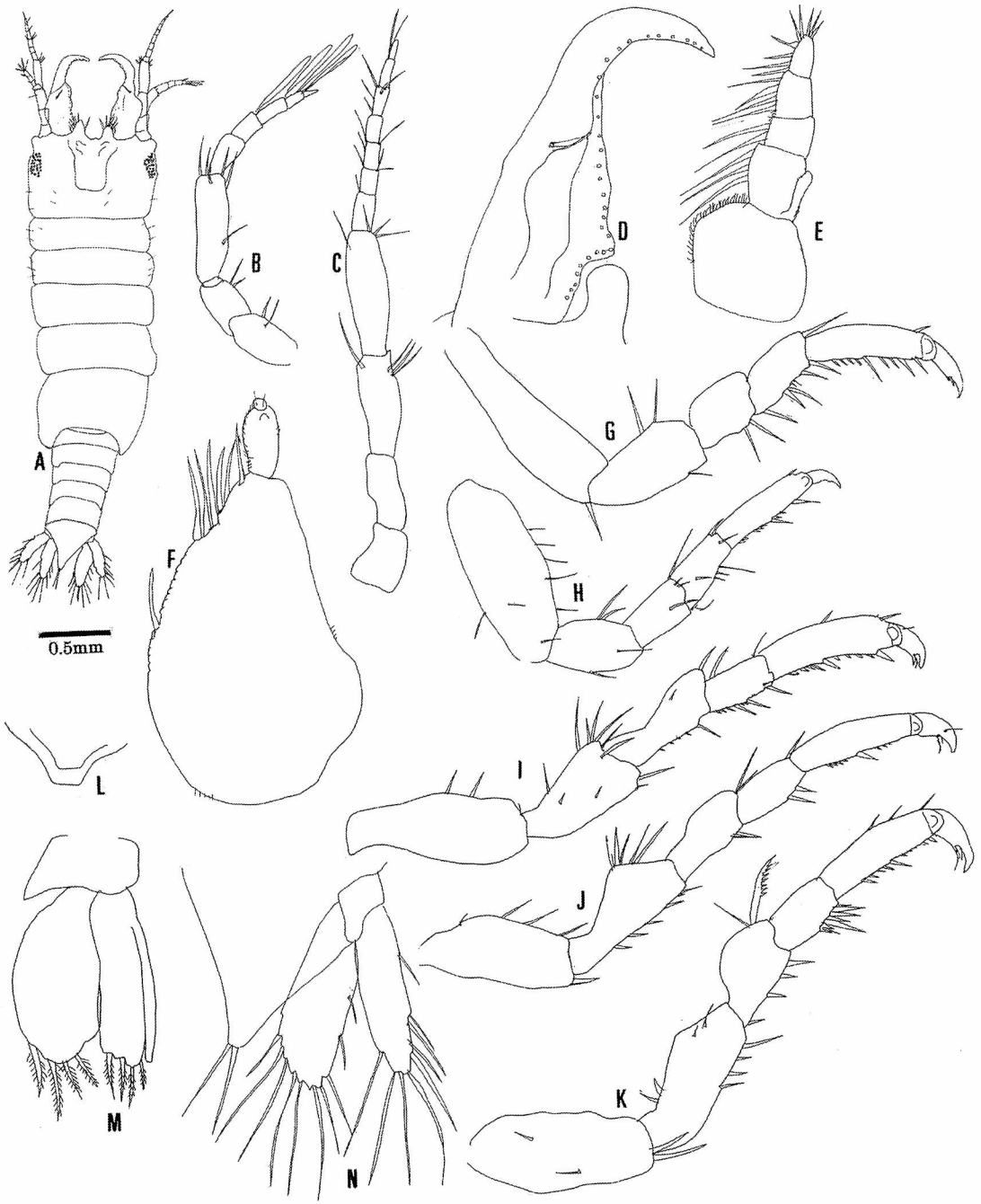

Fig.1 *Elaphognathia strombosa* n.sp.

A, Dorsal view; B, Antennule; C, Antenna; D, Mandible; E, Maxiiliped; F, Pylopod; G-K, Pereopods 2-6; L, Penes; M, Male second pleopod; N,Uropod (All, holotype male).

as long as wide and occupies 21% of body length. Eyes big, each eye with about 35 ommatidea, each ommatidium situated separately. Supraocular lobe low and round. Dorsal sulcus big and rectangular. Frontal process round, with 5 to 7 setae on apical area. Pereonal somites parallel, mutual length of each segment subequal in length Pleotelson triangular, 1.5 times as long as wide, with 2 setae at the tip.

Antennule (Fig.1B) with 3 peduncular segments and 5 flagellar segment; distal 3 segment with 5 aesthetascs. Antenna (Fig.1C) with 5 peduncular segments and 7 flagellar segments.

Mandibular seta (Fig.1D) internal lobe very low and weakly sinuates. Basal half stouter than distal area. Distal half narrow and bent innerward, with sinuate inner margin. Mandibular seta relatively short.

Maxilliped (Fig.1E) 5-segmented; segment 1 big, and as long as wide, with fine small setae on outer margin ; segment 2 with 3 setae on outer margin ; segment 3 with 4 setae on outer margin ; segment 4 with 5 setae ; segment with 7 setae on outer and distal margins. Epipodite slender.

Pylopod (Fig.1F) 3-segmented ; first segment big and long, 1.7 times as long as wide, with slightly sinuate margin and at least 7 plumose setae: Second segment elliptical, 2.2 times as long as wide; terminal segment small and round.

Pereopod 2 (Fig.1 G): basis relatively long, with a seta at inner distal angle; ischium with sternal margin bearing 2 setae; merus and carpus subequal in length; propodus 1.5 times longer than carpus, with 9-10 setae on inner margin.

Pereopod 3 (Fig.1 H): basis relatively short; ischium with 2 setae on outer margin; merus and carpus relatively short; propodus 1.6 times longer than carpus, with 2 setae on inner margin.

Pereopods 4-5 (Fig.1 I and J):basis relatively long; ischium with sternal margin bearing 5- 6 setae; merus a little shorter than ischium; propodus 1.8 times longer than carpus on inner margin.

Pereopod 6 (Fig.1K): basis with 2 setae at inner distal angle; merus with a serrated seta on outer margin; carpus with 8 setae on inner margin; propodus 1.6 times longer than carpus.

Penes (Fig.1 L) low and triangular.

Stylus of male second pleopod (Fig.1M) as long as endopod: both rami lanceolate, with 4 setae.

Uropod (Fig.1 N): both rami subequal in length, endopod broader than the exopod, each with 9-10 setae around the margin.

Etymology : The species name," *strombosa* " meaning "swollen area in Latin : The mandible with swollen basal part.

Remarks : Hitherto, 20 species of the genus *Elaphognathia* have been recorded from the world and 5 species from Japan (Monod, 1926; Gurjanova, 1936, Nunomura, 1981, 1998b, 1992, Ota *et al*, 2010). Among them, the present new species is most closely allied to *Elaphognathia monodi* Gurjanova reported from near Nahodka, the Sea of Japan, but the former is separated from the latter in the following features: (1) not concave frontal of border of cephalosome, (2) stouter basal part of mandible, (3) presence of epipodite of maxilliped, (4) rectangular eyes, and (5) longer second segment of pylopod.

The present new species is also allied to *Elaphognathia lucanoides* Monod, reported originally from Misaki, but the former is separated from the latter in the following features: (1) flat anterior margin of cephalosome, (2) shorter mandible, especially stout basal half, (3) longer body, (4) absence of projection on inner side of mandible, (5) presence of mandibular seta and (6) shorter pleotelson.

Elaphognathia lucanoides (Monod, 1926)

Material examined : 1♂, Hishio, Mukaishima, Hiroshima Pref. 28 Aug. 1998, coll. Shiegruki Yamato.

***Gnathia bungoensis* Nunomura, 1982**

(Japanese name: Bungo-umikuwagata)

Material examined : 1♂, *Ulva* bed, mouth of Banshou-gawa, Saiki-shi, Oita Pref. 14 Oct.1981, Michio Ootani. This is the holotype of this species.

Family Cirolanidae

***Excirolana chiltoni* (Richardson, 1905)**

(Japanese name: Hime-sunahorimushi)

Material examined : 1♀, intertidal of Enohama, Aji-cho, Kagawa Pref., 1975; 1♀, coll. Shin'ichiro Fuse and some scientist; 1♀, Enohama, Aji-cho, Kagawa, Mar,1976, Shin'ichiro Fuse;1♀, Nakajima, Ehime, Pref., Oct. 1.1991, coll. Noboru Nunomura; 2♂♂2♀♀, Ushimado, Okayama Pref. Oct. 9, 1991, coll. Noboru Nunomura; 1♀, Ushimado, Okayama Pref. Apr,, 1993, coll Akiyama ; 3♀♀, Hishio, Mukaishima, Hiroshima Pref. Aug, 1. 1980, coll. Shigeyuki Yamato ; 1♀Tikukou, Tamano-shi, Okayama Pref., Oct. 8. 2003, coll. Hiroshi Suzuki; 1♂ 2♀♀, Tachibana, Mukaishima, Hiroshima Pref., June, 1, 1993, coll. Noboru Nunomura ; 1♀, Nijiga-hama, Hikari-shi, Yamaguchi Pref., Oct. 21, 1993, coll. Noboru Nunomura; 3♂♂3♀♀, Hishio, Mukaishima, Hiroshima Pref. Oct. 12.1983, coll. Shigeyuki Yamato ; 1♀, Itsukushima, Miyajima-cho, Hiroshima Pref., June, 2, 1993, coll. Noboru Nunomura.

***Natatolana japonensis* (Richardson, 1904)**

(Japanese name: Yamatosunahorimushi)

Material examined : 1♀, subtidal zone of Nishiwaki, Sakaide-shi, Kagawa Pref. Feb. 1976, coll. Shin'ichiro Fuse and some scientist.

Family Cymothoidae

***Nerocila acuminata* Schioedte & Meinert, 1881**

(Japanese name:Uonokoban)

Material examined : 1♀, Ushimado, Okayama Pref., Nov. 9, 1991, coll. Noboru Nunomura.

***Mothocya* sp.**

Material examined : 3exs, Okadaiou Port, Okimi-cho, Edazima-shi, Hiroshima Pref., Aug. 4, 1998, coll. Takashi, Yonezi.

Suborder Limnoriidea

Family Limnoriidae

***Limnoria nagatai* n.sp.**

(Japanese name: Nagata kikuimushi, new)

Material examined : 6 ♂♂ (1♂ holotype, 4.2 mm in body length and 5♂♂paratypes, 3.0-5.1 mm in body length), Sumiyoshizaki, Kunimi-cho, Oita Pref. June 13, 1978, coll. Kizo Nagata ; 1 gravid♀ (allotype, 4.7 mm in body length), Ryozaki, Kunimi-cho, Oita Pref. 1976 or 1977, coll. Kizo Nagata. Non-type: 1♂, Ryozaki, Kunimi-cho, Oita Pref., 19, May, 1977, coll. Kizo Nagata. Holotype (TOYA Cr-23340) allotype (TOYA Cr-2335) and 4 paratypes (TOYA Cr-23341～23344) are deposited in Toyama Science Museum, Toyama and 2 paratypes (KMNH IvR540～541), Kitakyushu Museum of Natural History and Human History, Kitakyushu.

Description : Body (Fig.2A) cylindrical, 2.7 times as long as wide. Cephalosome round, three-fourths as long

as wide; anterior margin slightly protruded at medial point; posterior margin round. Eyes mediocre, each eye composed of 7-8 ommatidea. Pereonal somite subequal in length. Pleonal somites 1-5 perfect, pleonal somites 1-4 subequal in length, fifth segment about 3 times as long as fourth. Pleotelson round an elliptical, 0.55 times as long as wide, without any tubercles.

Antennule(Fig.2C) 5-segmented; terminal segment with 7-10 aesthetics at tip. Antenna (Fig.2D) 6-segmented, terminal segment with many setae at tip.

Mandible (Fig.2E): Cusps stout. Palp not found. Maxillula (Fig.2F) with 9-10 stout teeth, five of which provided with blunt teeth on mesial lobe; 5 setae on middle lobe and 3 setae on lateral lobe. Maxilla (Fig.2F) with 9-10 setae on mesial lobe; with 4 setae middle lobe; lateral lobe, with 3 setae. Maxilliped (Fig.2H): endite with a

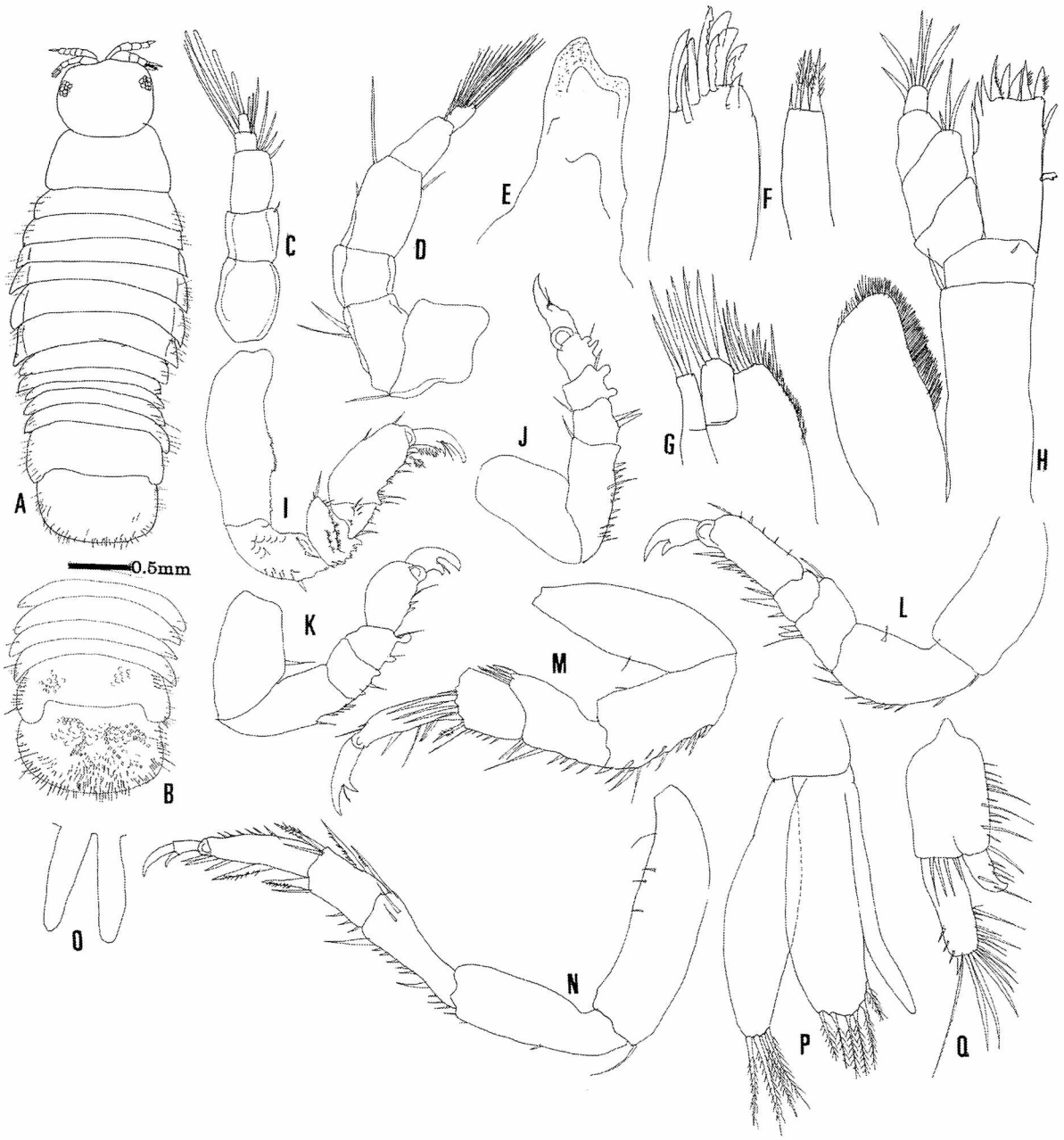

Fig.2 ***Limnoria nagatai*** **n.sp.**

A, Dorsal view; B, Pleon and pleotelson in dorsal view; C. Antennule; D, Antenna; E, Mandible; F, Maxillula; G, Maxilla; H, Maxiiliped; I-K, Pereopods 1-3; L-N, Pereopods 5-7; O. Penes; P, Male second pleopod; Q, Uropod (All, holotype male).

coupling hook on lateral margin and 8 setae including 3 serrated ones on distal margin; segments 1 and 2 subequal in length, third segment 0.8 times as long as second; segment 4 and 5 abruptly narrower than segments 1-3; epipodite, reaching the basal part of third palpal segment, rectangular, with serrated distal margin and with much hair around the margin.

Pereopod 1: (Fig.2I): basis with rough notches on outer margin; ischium with scale-structures on lateral margin; merus with 6 tubercles outer distal part elongated; carpus triangular; propodus subchelate, with 4 longer setae and several shorter ones on inner margin; dactylus bifid, inner unguis bifid, outer unguis long, inner margin serrated.

Pereopod 2 (Fig.2J): basis relatively stout, with 1.5 times as long as wide; ischium with many setae on inner margin; merus relatively short, with 2 small tubercles; carpus relatively short with 2 tubercles; propodus round, with more than 14 setae including a plumose one on inner margin; dactylus bifid, secondary unguis short.

Pereopod 3 (Fig.2K) :basis short, with a seta on outer margin; ischium with 6 setae on distal half of inner margin; merus relatively short, with 2 tubercles; carpus relatively short, with 2 tubercles ; propodus relatively short, with 2 tubercles; dactylus bifid, secondary unguis short. Pereopod 4 similar to pereopod 3, but a little longer than the latter.

Pereopod 5 (Fig.2 L) :basis longer than those of the preceding pereopods ; ischium with 8 setae on inner margin; merus with 2 stout setae and a simple seta on inner margin; carpus square, shorter than wide, with 3 setae on inner margin; propodus with 7-8 setae on inner margin; dactylus bifid, secondary unguis short.

Pereopod 6 (Fig.2 M):basis 2.9 times as long as wide; ischium with many setae on innar area; merus with 7-8 setae ; carpus rectangular, with 4 to 5 long setae on distal margin; propodus with 7-8 setae on inner margin; dactylus bifid, secondary unguis short.

Pereopod 7 (Fig.2N) a little longer than pereonal somite 6: basis 3.5 times as long as wide, with a seta at inner distal area; ischium 0.7 times as long as basis; merus two-thirds as long as ischium; carpus two-thirds as long as merus, with 2 serrated setae on distal margin and outer margin; propodus 1.5 times longer than carpus, with 4 setae including a serrated one on inner margin; dactylus bifid, secondary unguis short.

Penes (Fig.2O) paired; each penis 3.7 times as long as wide. Stylus of male second pleopod (Fig.2P) a little exceeds both rami, each ramus with 4 setae on distal margin

Uropod (Fig.2Q): basis rectangular; endopod rectangular, times as long as wide, with more then a dozen with apical margin; exopod about 1/3 of endopod with 3 setae at the tip.

Female similar to male except sexual features. Allotype with 11 eggs in her brood pouch.

Etymology : The species name is dedicated to Dr.Kizo Nagata, collector of the present specimen and taxonomists on gammarid crustaceans.

Remarks : Hitherto, at least 53 species of the genus *Limnoria* have been reported from the world and 5 species in Japan (Menzies, 1957, Nunomura, 2008, 2011). Among them, the present new species is most closely allied to *Limnoria saseboensis* reported from Sasebo, Nagasaki, western Kyushu, but the former is separated from the latter in the following features; (1) shorter pleotelson, (2) shorter exopod of uropod, (3) more setose surface of pleotelson, (4) wider epipodite of maxilliped, (5) wider endite of maxilliped, (6) presence of scale-like structures on ischium, merus and carpus of pereopod 1, (7) wider posterolateral margin of fifth pleonal somite and (8) roughly notches outer margin of basis of margin of pereopod 1.

The present new secrecies is also separated from the relatively common species in Japan, *Limnoria japonica*, but separated from *japonica* in the following features: (1) lack of tubercles on pleonal somites and pleotelson, (2) wider epipodite of maxilliped, (3) less sinuate margin of basis of uropod and (4) roughly notches outer margin of basis of margin of pereopod 1.

Suborder Sphaeromatidea

Family Sphaeromatidae

***Chitonosphaera lata* (Nishimura, 1968)**

(Japanese name: Habahiro-kotsubumushi)

Material examined : 1♀mouth of Shigenobu-gawa, Matsuyama-shi, Ehime Pref. Apr.20.2004,coll.Keiji Wada; 1♀,Okazaki-kaigan, Naruto-shi, Tokushima Pref., May 14, 1998, coll. Noboru Nunomura; 2♂♂2♀♀, mouth of Shigenobu-gawa, Akou-shi, Hyogo Pref., Aug. 25, 2004, coll, Keiji Wada.

***Sphaeroma wadai* Nunomura, 1994**

(Japanese name: Iwahori-kotsubumushi)

Material examined : 1♀, Mouth of Yoshino-gawa, Kofu-machi, Tokushima Pref. Apr. 18, 2003, coll. Keiji Wada.

***Sphaeroma sieboldii* Dollfuss, 1888**

(Japanese name: Nanatsuba-kotusubumushi)

Material examined : 5♀♀, Hoboro-tou, Higashihiroshima-shi, Hiroshima Pref. June 29, 2007, coll. unknown.

***Sphaeroma retrolaevis* Richardson, 1904**

(Japanese name: Yotuba-kotubumushi)

Material examined : 1♀, intertidal of Nishiwaki, Sakaide-shi, Kagawa Pref. Mar.1975, Shin'ichiro, Fuse and other scientists ; Mouth of Yoshino-gawa, Kofumachi, Tokushima, Apr. 18, 2003, coll. Keiji Wada; 1♂3♀♀, Shin-maiko, Tatsuno-shi, Aug. 4, 2004, Hyogo Pref., coll. Keiji Wada; 3♀♀, Shin-maiko, Tatsuno-shi, Hyogo Pref., Aug. 24, 2004, coll. Keiji Wada; 5♀♀Shin-maiko, Akou-shi, Hyogo Pref., Aug. 25, 2004, Hyogo Pref., coll, Keiji Wada; 6♀♀, Kakogawa, Takasago-shi, Aug. 25, 2004,Hyogo Pref., coll, Keiji Wada.

***Gnorimosphaeroma rayi* Hoestlandt, 1969**

(Japanese name: Iso-kotsubumushi)

Material examined : 14♂♂4♀♀, mouth of Odagawa, Kurashiki-shi, Okayama Pref. Feb. 23, 1993., coll Noboru Nunomura; 1♂, Nishiwaki, Kagawa Pref. Mar. 1975, Sakaide Shin' ichiro, Fuse and other scientists.

***Gnorimosphaeroma hoestlandti*, Kim and Kwon 1985**

(Japanese name: Futage-kotsubumushi)

Material examined : 4exs、Mishou, Ehime Pref. 9 Apr. 2004, Keiji Wada.

***Gnorimosphaeroma paradoxa* (Nunomura, 1988)**

(Japanese name: Kotsubumushi-damashi)

Material examined : 4♂♂1♀, Uwajima, Quay Wall, Benten-cho, Uwajima-shi, Ehime Pref., Mar. 1963, Michio Ootani.

These are the type series of this species, which Nunomura (1988a) described as a new species of *Nishimuraia paradoxa*, but, recently this species is now treated as *Gnorimosphaeroma paradoxa*. (Shotte *et al.*)

***Dynoides dentisinus* Shen, 1929**

(Japanese name: Shiriken-umisemi)

Material examined : 6♂♂2♀♀, Kuheikojima, Nakajima, Ehime Pref.Oct.7,1991, coll. Noboru Nunomura; 1♂,

Okazaki-kaigan, Naruto-shi, Tokushima Pref., May14, 1998, coll. Noboru Nunomura.

Cymodoce acuta Richardson, 1904

(Japanese name: Futotoge-kotsubumushi)

Material examined : 1♀, subtidal of Enohama, , Aji-cho, Kagawa Pref., Feb. 1975, coll. Shin'ichiro, Fuse and other scientists; 3♀♀ subtidal of Enohama, Aji-cho, Kagawa Pref., Shin'ichiro Fuse and other scientists: 2♂♂, Kamano, Aji-cho, Kagawa Pref. Feb.1975; 1♂1♀, *Sargassum*-bed, Ryozaki, Kunimi-machi, Oita Pref., Nov. 14, 1977, coll, Kizo Nagata; 2♂♂8♀♀, *Sargassum*-bed, Ryozaki, Kunimi-machi, Oita Pref., 1977, coll. Kizo Nagata.

Cymodoce japonica Richardson, 1907

(Japanese name: Nihon-kotsubumushi or umisemi)

Material examined : 2exs, Ushimado, Okayama Pref., 31 May 1990, coll. Noboru Nunomura; 2♀♀, Kamano Aji-cho, Kagawa Pref., Feb. 1975, coll. Shin'ichiro, Fuse and other scientists; 3♀♀, Enohama, Aji-cho, Kagawa Pref., Feb. 1976, coll. Shin'ichiro, Fuse and other scientists.

Paracerceis suclupta (Holma, 1904)

(Japanese name: Tsuno-umisemi)

Material examined : 9♂♂3♀♀, Uwajima Port, Benten-cho, Uwajima- shi, Ehime Pref. Aug.1986., coll. Michio Ootani. These are specimens of the type series of the *Paracerceis japonica* Nunomura, 1988. But, Ariyama and Otani (2004) proved that this is a synonym of *Paracerceis suclupta* (Holma, 1904).

Holotelson tuberculatus Richardson, 1909

(Japanese name: Chibi-umisemi)

Material examined :2♂♂1♀, *Sargassum*-bed, Sumiyoshizaki, Kunimi-machi, Oita Pref. Nov. 4,1977, coll. KizoNagata; 3♂♂1♀, *Sargassum*-bed, Ryozaki, Kunimi-machi, Oita Pref., Nov. 4, 1977, coll. Kizo Nagata; 1♀, intertidal of Nishiwaki, Sakaide-shi, Kagawa Pref., Mar, 1975, coll. Shin'ichiro Fuse and other scientists.

Holotelson longicauda Nunomura, 2004

(Japanese name: Onaga-umisemi)

Material examined : 4♂♂1♀, *Sargassum*-bed, Ryozaki, Kunimi-machi, Oita Pref., May19,1977, coll. Kizo Nagata; 3♂♂1♀, *Sargassum*-bed, Ryozaki, Kunimi-machi, Oita Pref., 1977, coll. Kizo Nagata; 4♂♂5♀♀, *Sargassum*-bed, Ryozaki, Kunimi-machi, Oita Pref., Nov 14, 1977, coll, Kizo Nagata; 3♂3♀♀, *Sargassum*-bed, Sumiyoshizaki, Kunimi-machi, Oita Pref., Nov. 14, 1977, coll. Kizo Nagata.

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